

# G3-Alliance

# Semitech Semiconductor

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## G3-PLC Communications In Smart Trucks

October 2024

# The Drive Towards The Smart Truck Trailer

- Required Tracking of a **multitude of sensors**
  - Tyre Pressure, Brakes, Wheel Bearings, Temperature, Door Open Detection, Lighting Clusters
- Real-time Telematics enhances **Safety and Security** of both Driver and Cargo



G3 PLC can play a key role – lets see why

# Challenges In Modern Commercial Vehicles

- Trucks are becoming bigger with more trailers
  - With Multiple trailers the Tyre Pressure Monitoring System (TPMS) wireless signals can experience range limitations
- Drivers are becoming more insulated from the trailer
  - Modern Cabs are much more insulated from vibration and noise,
  - No longer possible to use your ears and eyes to detect looming problems
- Pre-emptive maintenance is critical to keeping the vehicle up-time and ensuring safety
  - Detecting wear in key components is critical to this process
  - Driver warnings are key to safety
  - Fleet managers need real time access to this data
- Without tools the driver is a single-point of failure to ensure cab hook-up to the correct trailer

# Key Elements To be Monitored/ Controlled

- TPMS ( Tyre Pressure Monitoring System)
- Wheel bearings ( either acoustic or temperature)
- Trailer ID
- Trailer temperature, refrigeration unit compressor
- Tail lighting clusters, side lighting



# G3-PLC: A Solution for Worldwide Use

- Currently many sensors use one or another form of low power wireless
  - Bluetooth or a variant is a commonly used solution that connects to an in-cab monitor (e.g. iPad).
  - ▼ Battery capacity internal to sensor is often the lifetime limiting issue
  - ▼ Faraday cage effect of trailers plus length of “road trains” challenge reliability of wireless link
- A cost-effective alternative is to use powerline communications on the trailer’s existing 24-volt DC supply to create a network to monitor data from multiple sensors
  - Ensures robust reliable communications with enhanced security
  - North American trucks already use PLC for their ABS systems -- PLC4Trucks
  - G3-PLC can run coincidental with PLC4Trucks so can be used worldwide
  - Required sensors have low data rates; G3-PLC has more than enough data bandwidth
  - Data can be collected and “bridged” to cab with a PLC to Bluetooth gateway

Powerline Communication is already being deployed on trucks worldwide

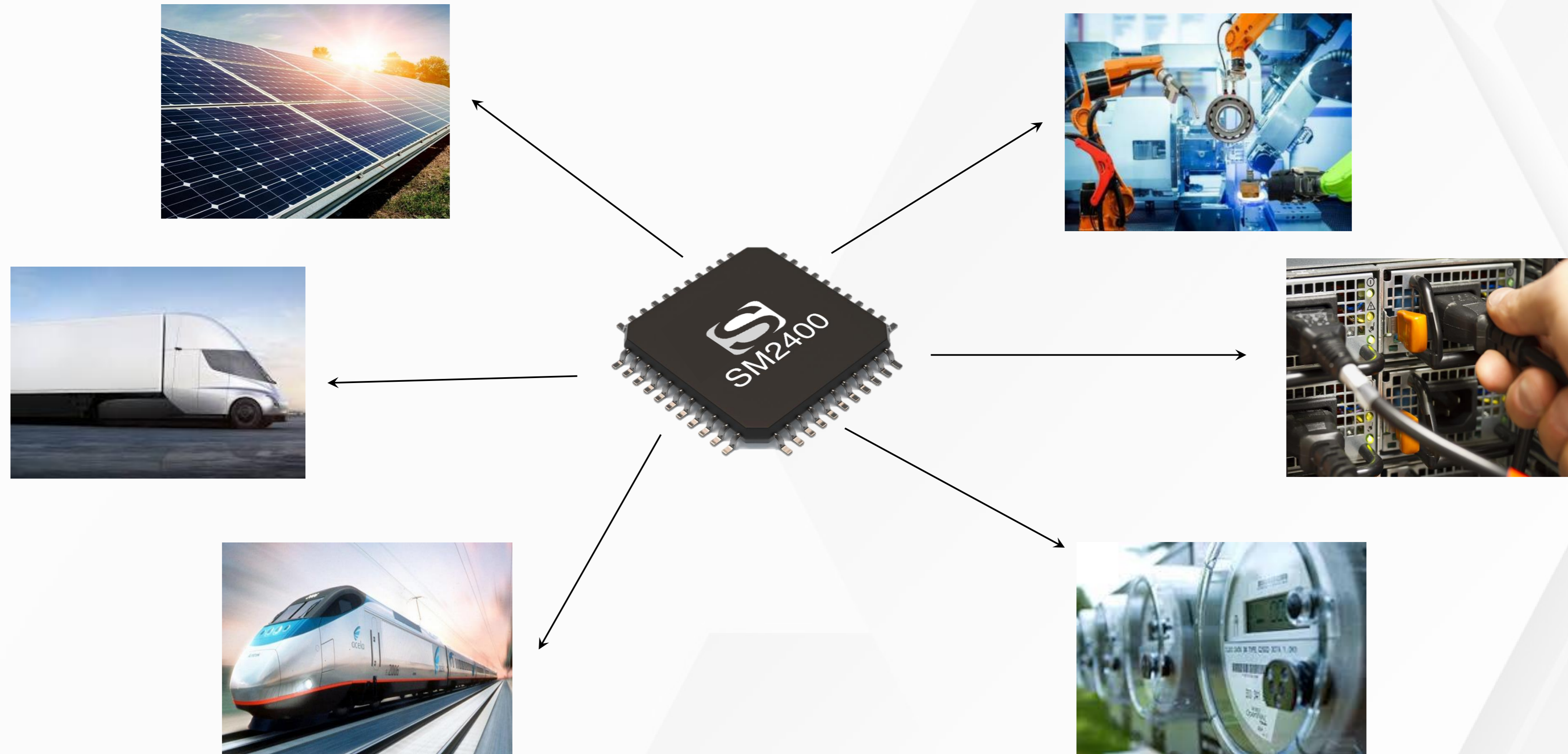
# Typical Application

- G3-PLC communicates on the 24 volt DC battery supply
- A Bluetooth/PLC bridge can be used at the front of the trailer to transfer data between tractor cab and trailer – we have reference designs
- The data interface to the telematics system is already in the cab which sends the diagnostic data to the fleet control (cellular backhaul)
  - The light clusters are locally controlled.

**BIG ADVANTAGE: No additional cabling needed to interconnect tractor and trailer**

# SM2400

Enables communications over AC / DC power lines for monitoring and control in a wide range of industrial devices and applications



# SM2400 – Universal N-PLC Modem

SM2400 offers the most comprehensive set of communication modes for IoT applications

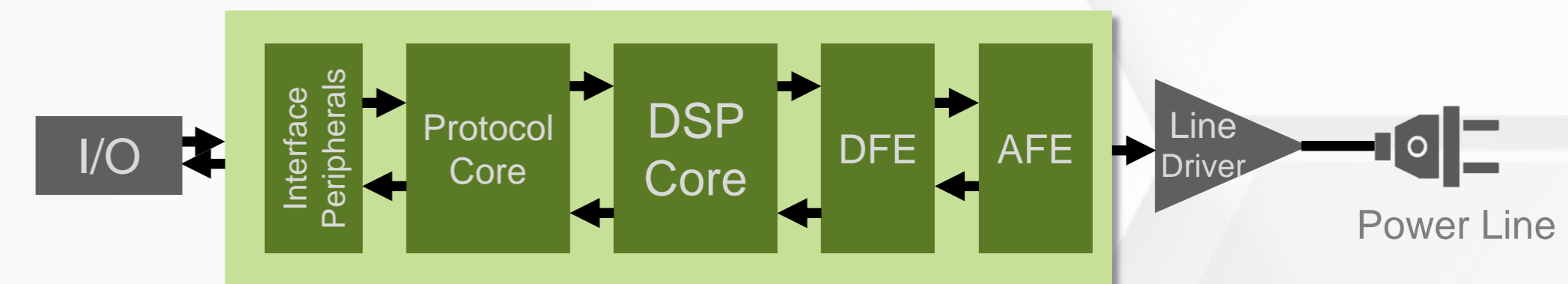
- **Metering:** PRIME, G3-PLC, IEEE 1901.2
- **Automotive:** PLC4TRUCKS
- **Industrial:** XXR, SunSpec, SMESH, Speedlink ( high speed)



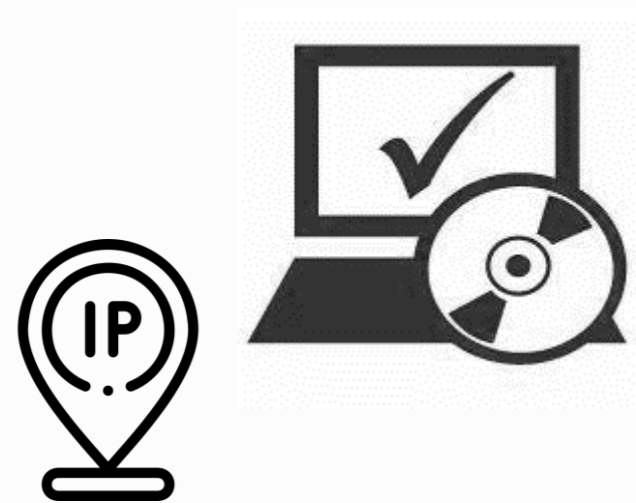
Programmable architecture enables continuous improvement and performance enhancement

## Superior Flexibility and Noise Immunity

- Data Rates up to
  - 466 kbps (FCC)
  - 621 kbps (Full Band)
- Programmable high-performance OFDM engine
- Efficient power consumption
- Operates over AC/DC lines
- Operates over multiple bands up to 490kHz: FCC, CEN-A, B, C, Full-band
- SPI / UART micro-controller interface
- 3.3V ( 5V ) tolerant I/O
- Small size package: 64pin LQFP (7mm x 7mm)



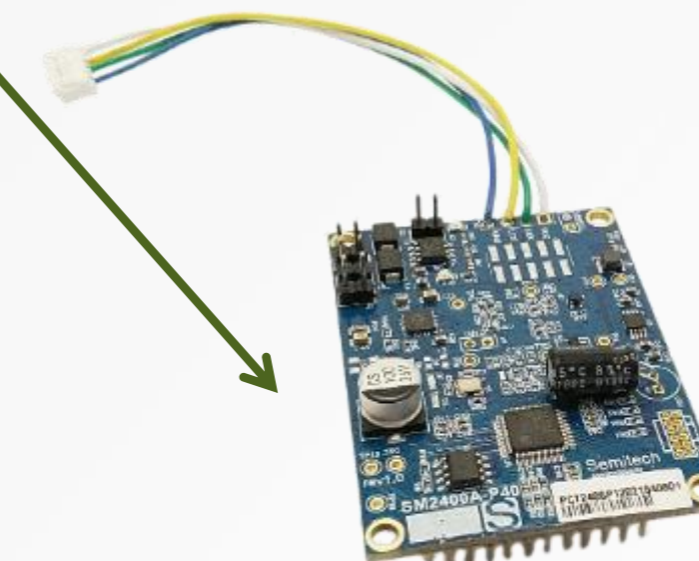
# Product Portfolio – IP, Chips and Modules



SM2400 PLC Module



SM2400 PLC + RF Module



SM2400 PLC4TRUCKS Module

## Communications IP

- Algorithm Implementations of international Standards
- Proprietary Modulations and Protocols
- Hardware Description Language implementations of various programmable cores and signal processing blocks

## SM2400 Modem IC

- Universal N-PLC modem
- Most comprehensive set of communication modes
- Superior performance in noisy line conditions
- Low system cost
- Operates on AC / DC lines
- Extensive evaluation and development tools

## Turnkey Module Solutions

- Fast Time-to-Market
- Minimize design risk
- Custom Designs

Products and Offerings to meet a broad range of industrial customer needs

# SM2400 Turnkey PLC Module

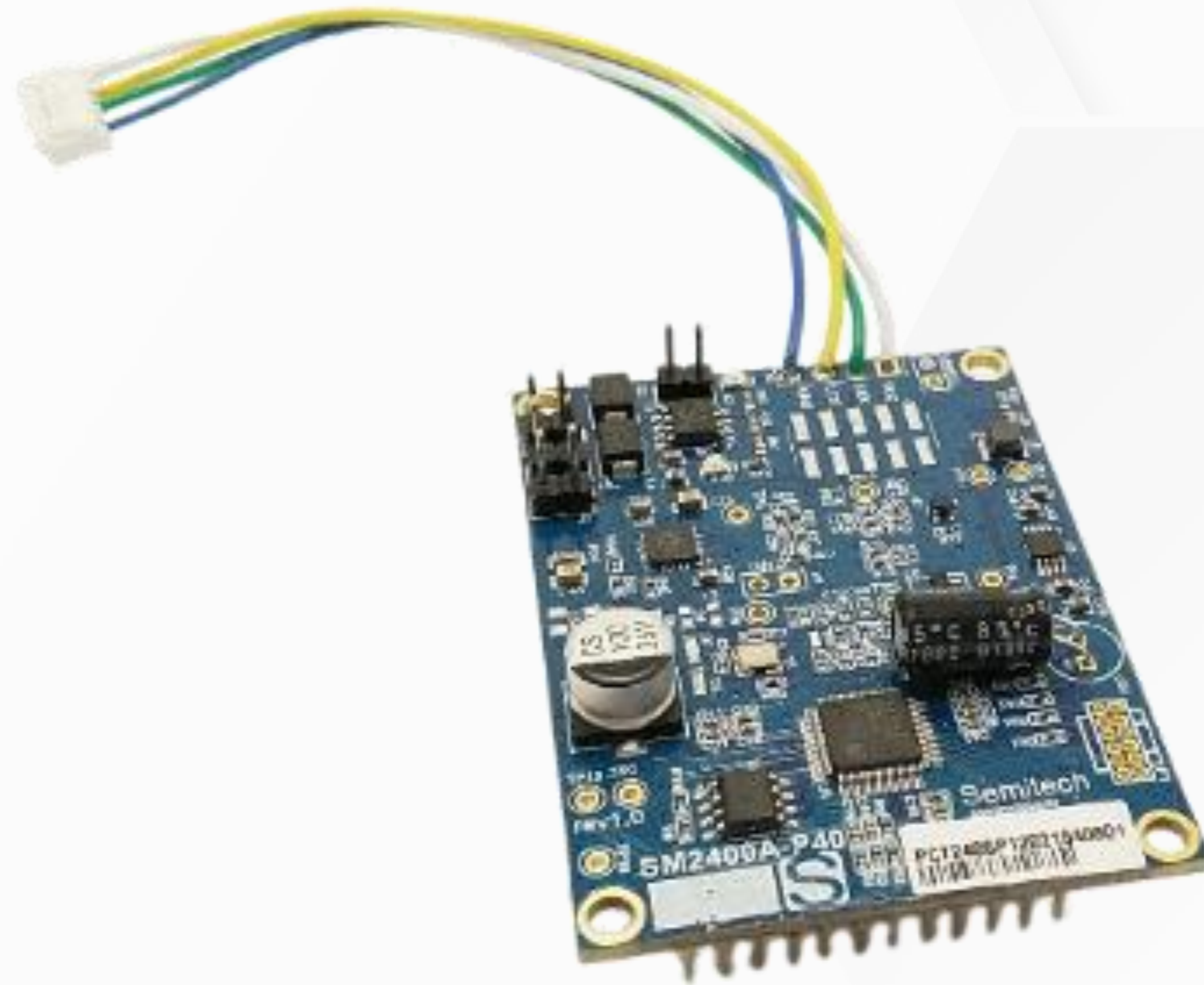
Ideal for Industrial Applications



Fast Time-to-Market with Minimal Design Risk  
Need a custom version ? Ask us how.

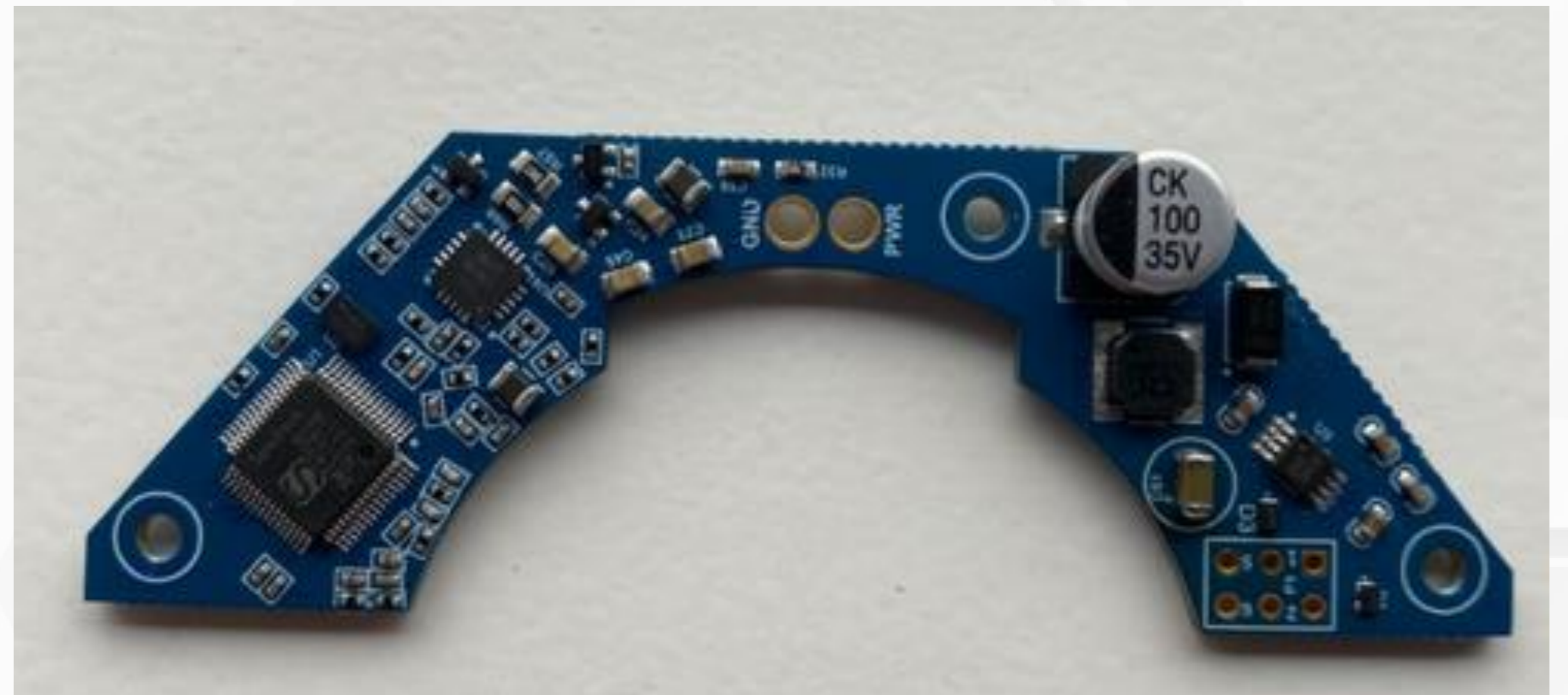
# SM2400 Module – used for G3-PLC and PLC4 Trucks

Deployed in Truck/Trailers



An industry standard adopted by multiple companies for truck applications

# Example: Custom PLC Module in a Truck/Trailer Connector



Semitech custom design

# Want To Know More?

**Thank you for joining us today**

Check out [semitechsemi.com](https://semitechsemi.com)

Contact: [Stewart.Gebbie@semitechsemi.com](mailto:Stewart.Gebbie@semitechsemi.com)

## Don't miss the other G3 expert sessions this week!

Day & Time		Topic	Expert
Tuesday Oct. 22 <sup>th</sup>	11 am	<b>Linky in France: 40 million G3-PLC smart meters!</b>	Marc Delandre, Director Network Technologies at Enedis (France)
	1 pm	<b>Multi-utility metering with G3!</b>	Klaus Hueske, Smart Grid Communications Team, Renesas Electronics
	3 pm	<b>Smart metering in Poland</b>	Nerijus Kruopis, Elgama-Elektronika Kuba Kurnik, ESMETRIC
Wednesday Oct. 23 <sup>th</sup>	11 am	<b>G3-Hybrid: the best of wired and wireless communication</b>	Juan Camacho, Andrea
	1 pm	<b>G3-PLC in Smart Solar applications</b>	Riccardo Fiorelli, PLC & Hybrid Application Manager at STMicroelectronics
	3 pm	<b>Everything you want to know about the G3 specification</b>	Cédric Lavenu, Research Engineer EDF R&D
Thursday Oct. 24 <sup>th</sup>	11 am	<b>G3-PLC communication in trucks</b>	Stewart Gebbie, Sales Director Semitech
	1 pm	<b>Water and Gas metering with G3!</b>	Klaus Hueske, Smart Grid Communications Team, Renesas Electronics

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